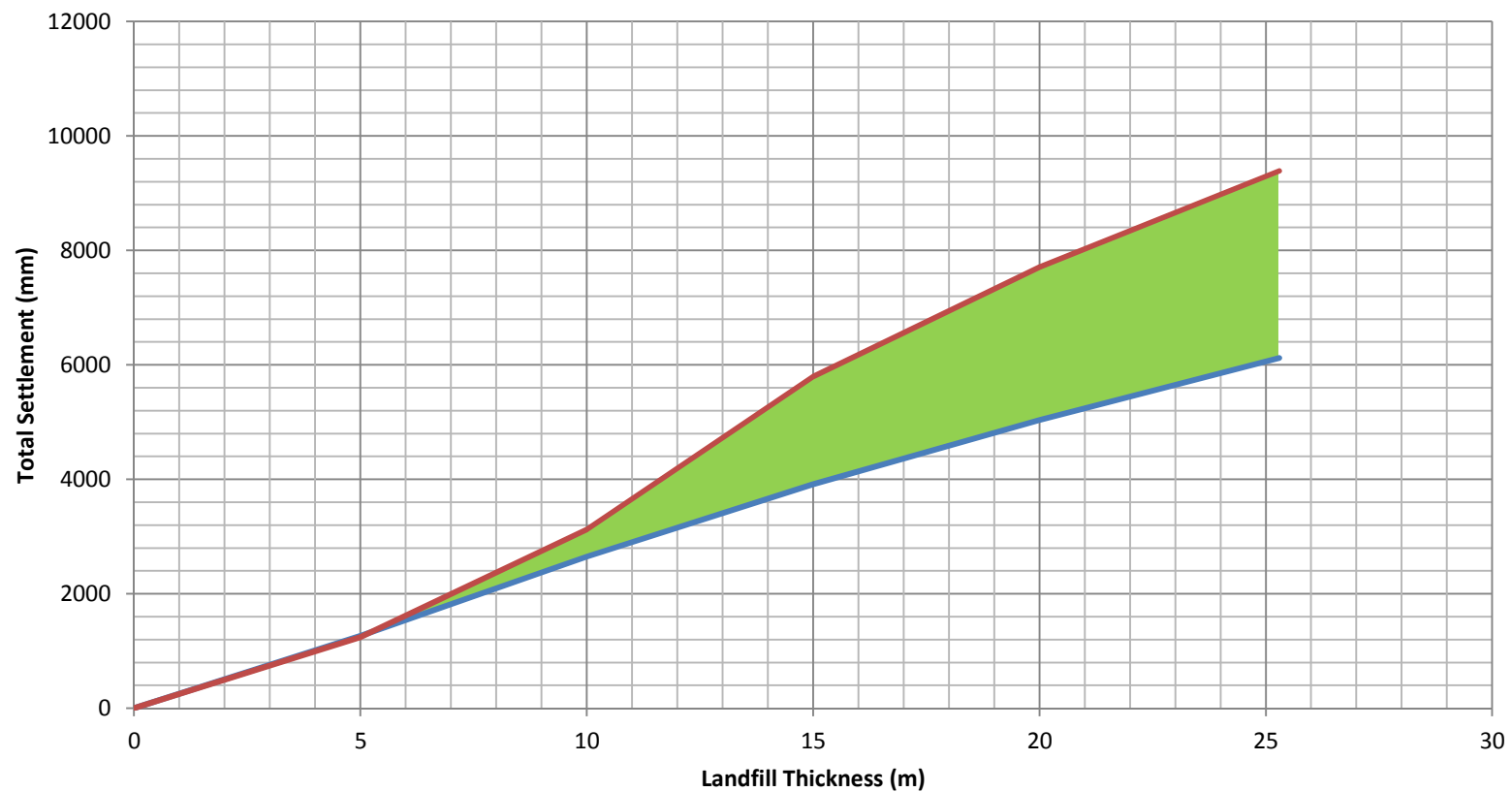
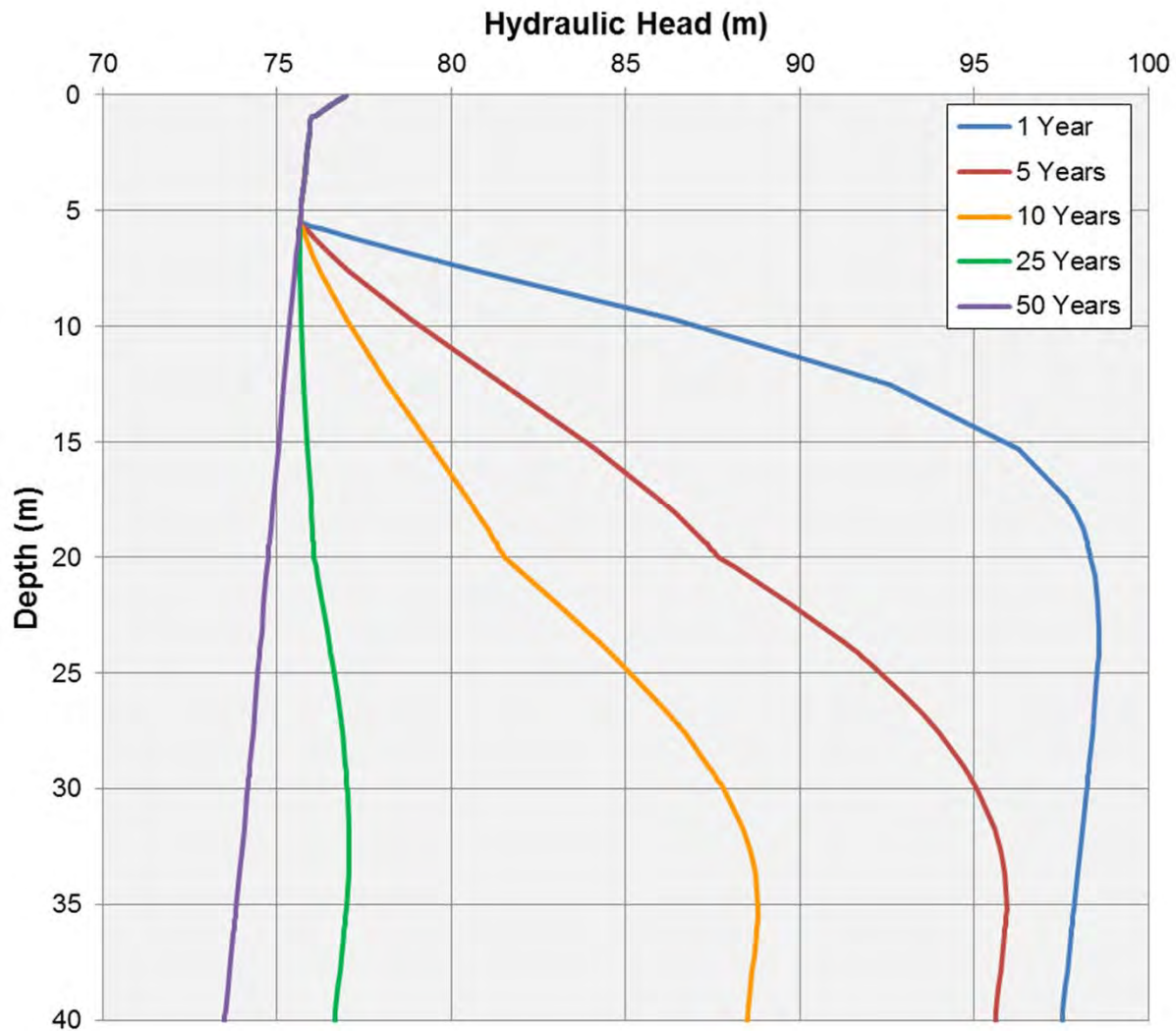




CALCULATED RANGE OF TOTAL SETTLEMENT
TOTAL SETTLEMENT VERSUS LANDFILL THICKNESS - 100 YEARS
CAPITAL REGION RESOURCE RECOVERY CENTRE

Project No.	12-1125-0045
Drawn:	CK
Date:	Nov. 2013
Checked:	PLE
Review:	PAS

Figure 11-6



NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

HYDRAULIC HEAD PROFILES GENERATED BASED ON SETTLE-3D MODEL RESULTS AND OBSERVED VERTICAL GRADIENTS

SETTLE-3D MODEL ACCOUNTS FOR LEACHATE COLLECTION SYSTEM AT 0.3 METRES DEPTH AND ALLOWS DRAINAGE OF THE UPPER CLAY THROUGH THE SILTY LAYER

PROJECT

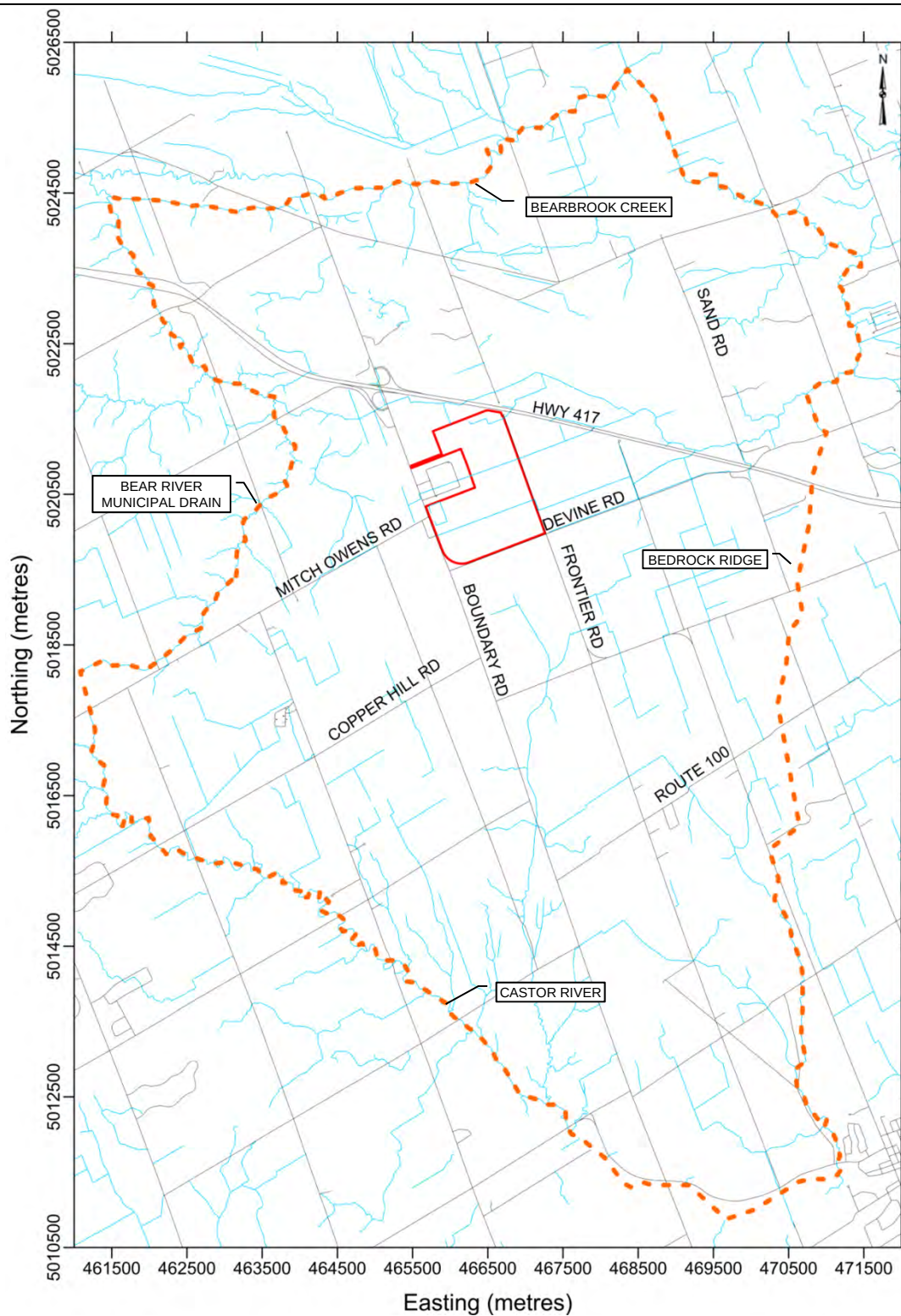
CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

Hydraulic Head Development During Consolidation



PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	MIB	Nov. 2013	SCALE AS SHOWN	REV.0
GIS	--	--	FIGURE 12-1	
CHECK	PLE	Aug. 2014		
REVIEW	PAS	Aug. 2014		



LEGEND

- WATERBODIES
- ROADS
- PROPERTY BOUNDARY
- - - MODEL DOMAIN

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT

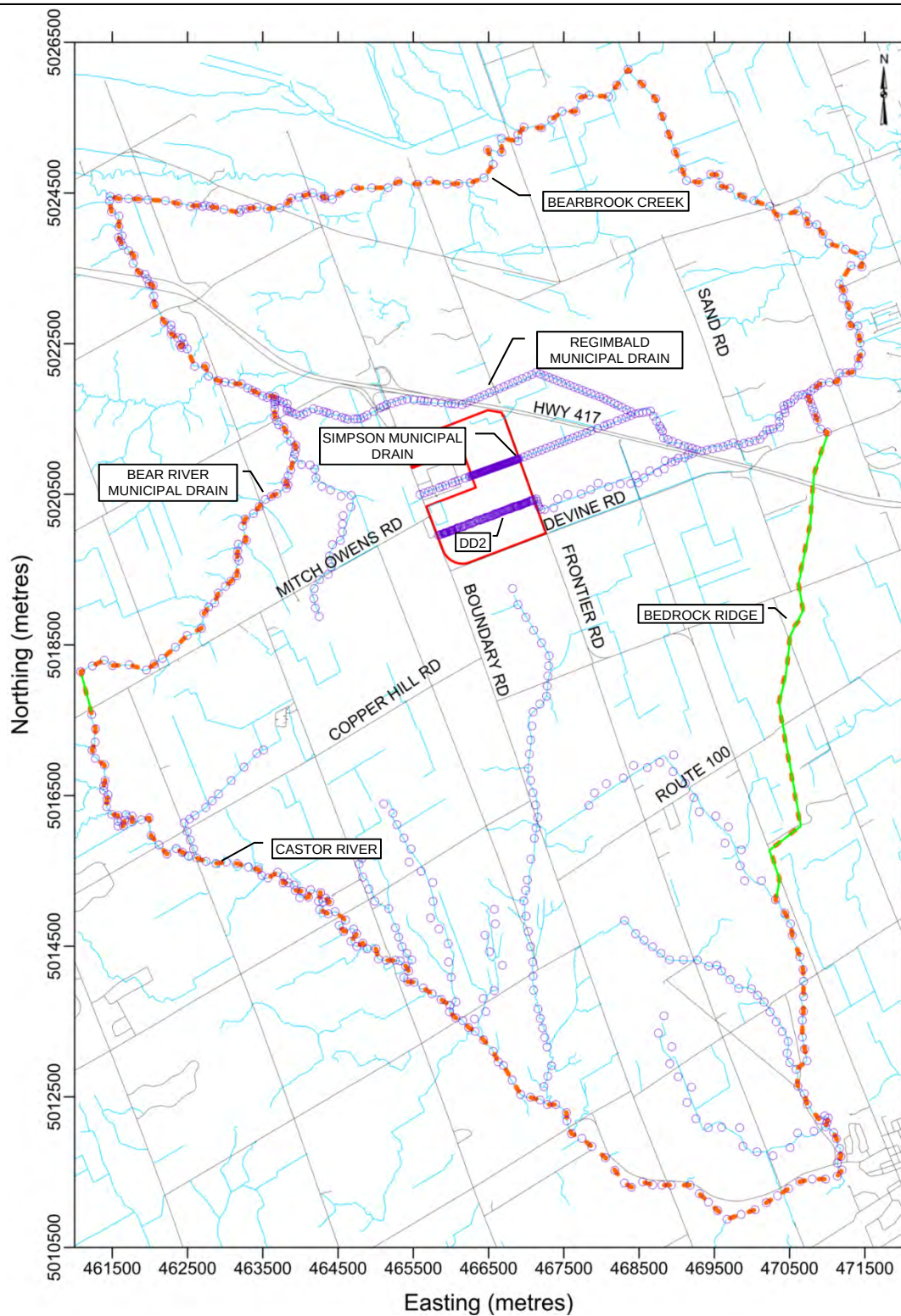
CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

3-D Numerical Groundwater Model Domain



PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	MIB	Nov. 2013	SCALE AS SHOWN	REV.0
GIS	--	--	FIGURE 12-2	
CHECK	PLE	Aug. 2014		
REVIEW	PAS	Aug. 2014		



LEGEND

- WATERBODIES
- ROADS
- PROPERTY BOUNDARY
- MODEL DOMAIN
- SPECIFIED HEAD OR SEEPAGE BOUNDARY
- NO FLOW BOUNDARY

NOTE

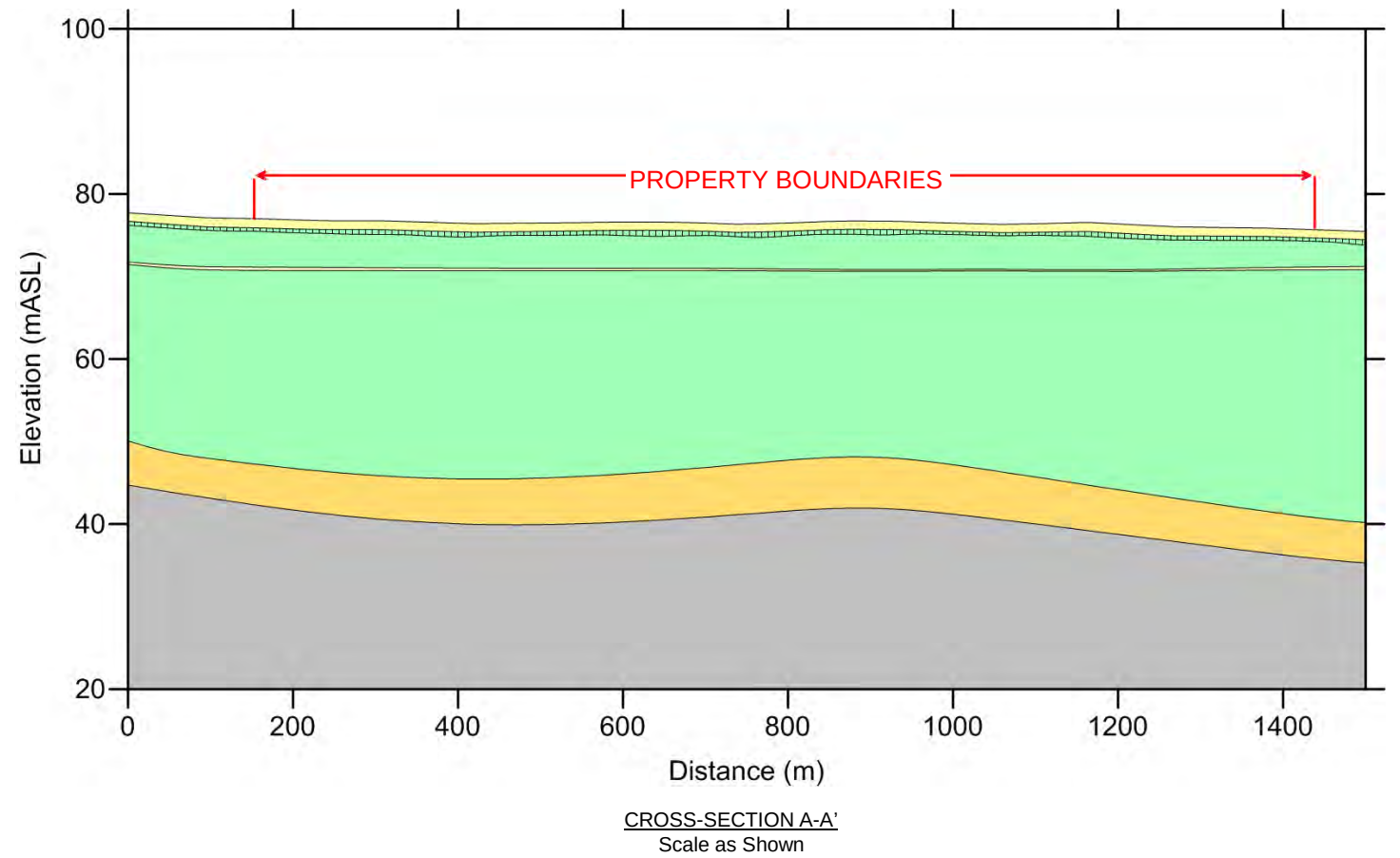
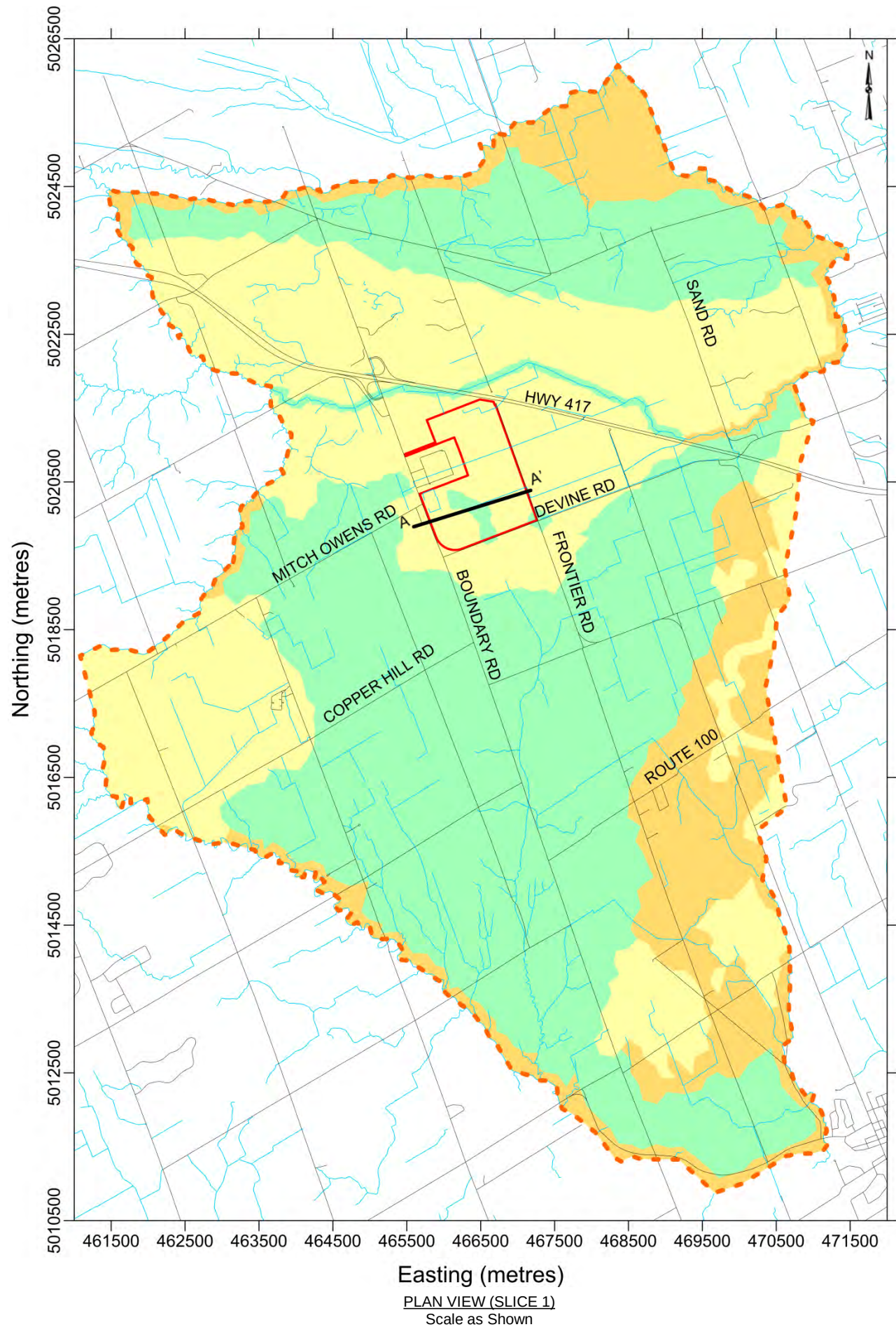
THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT			
CAPITAL REGION RESOURCE RECOVERY CENTRE			
TITLE			
Boundary Conditions 3-D Numerical Groundwater Model			
PROJECT No. 12-1125-0045		PHASE No. 4500	
DESIGN	MIB	Nov. 2013	SCALE AS SHOWN
GIS	--	--	REV.0
CHECK	PLE	Aug. 2014	FIGURE 12-3
REVIEW	PAS	Aug. 2014	





SUMMARY OF HYDRAULIC PARAMETERS

Unit	Horizontal Hydraulic Conductivity (m/sec)	Anisotropy ($K_H:K_V$)	Specific Storage (m^{-1})	Specific Yield (-)
Surficial Silty Sand	2.0×10^{-5}	1:1	2.0×10^{-4}	0.2
Weathered Clay	1.0×10^{-7}	10:1	2.0×10^{-3}	0.05
Unweathered Clay	1.0×10^{-8}	10:1	2.0×10^{-3}	0.05
Silty Layer	8.0×10^{-7}	1:1	2.0×10^{-4}	0.1
Glacial Till	1.5×10^{-6}	1:1	2.0×10^{-4}	0.1
Queenston Shale Bedrock Formation	5.5×10^{-7}	1:1	3.0×10^{-6}	0.01
Carlsbad Bedrock Formation	7.0×10^{-7}	1:1	3.0×10^{-6}	0.01

LEGEND

- WATERBODIES
- ROADS
- PROPERTY BOUNDARY
- MODEL DOMAIN
- SURFICIAL SILTY SAND
- SILTY CLAY
- GLACIAL TILL
- CARLSBAD BEDROCK FORMATION

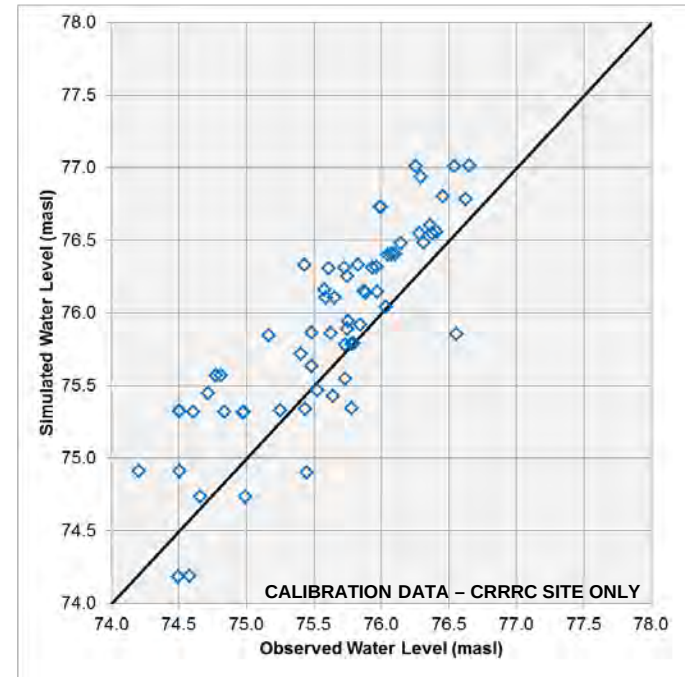
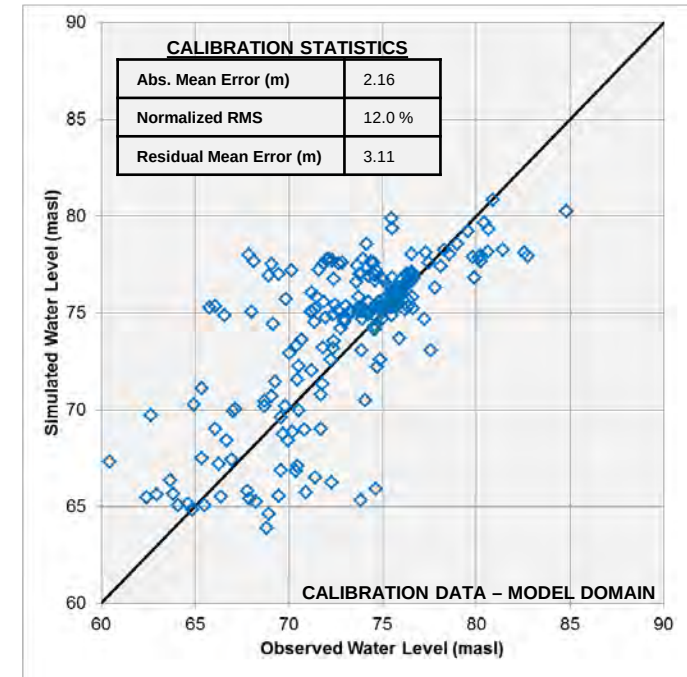
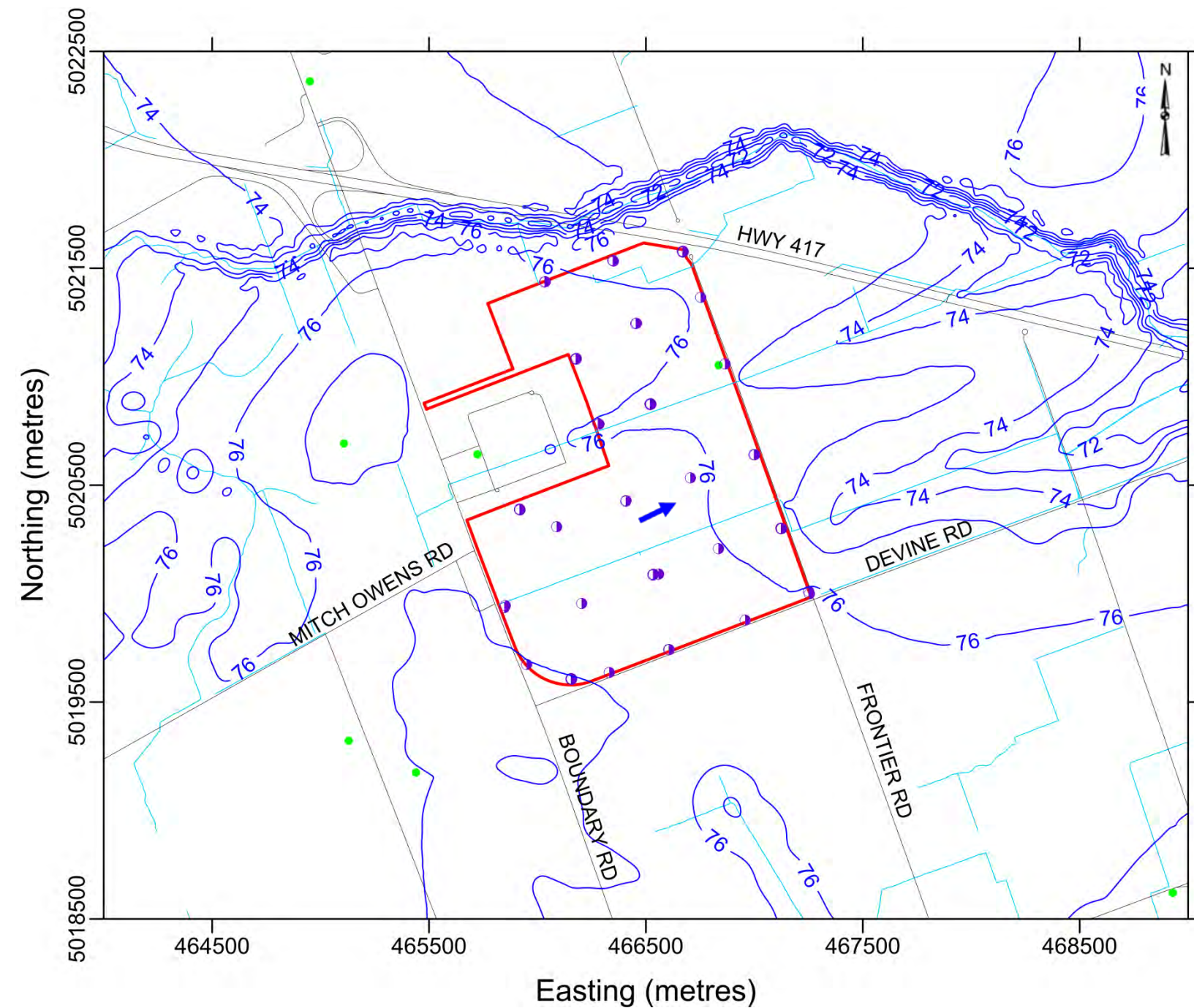
NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES. © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT				CAPITAL REGION RESOURCE RECOVERY CENTRE							
TITLE				Hydraulic Conductivity Distribution 3-D Numerical Groundwater Model							
				PROJECT No. 12-1125-0045		SCALE AS SHOWN		REV.0			
				DESIGN	MIB	Nov. 2013		FIGURE 12-4			
				GIS	----	----					
				CHECK	PLE	Aug. 2014					
				REVIEW	PAS	Aug. 2014					



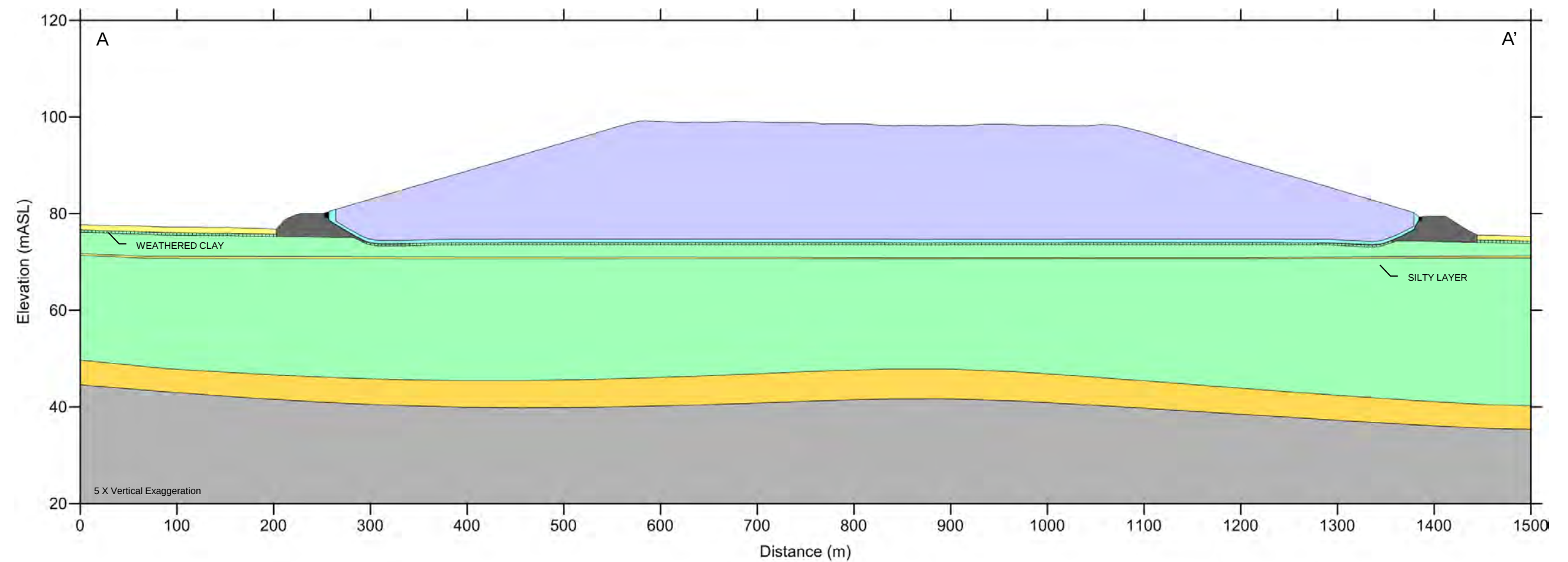
- LEGEND**
- WATERBODIES
 - ROADS
 - PROPERTY BOUNDARY
 - GROUNDWATER ELEVATION (metres ABOVE SEA LEVEL) (2 metre contour interval)
 - INTERPRETED GROUNDWATER FLOW DIRECTION
 - MONITORING LOCATION (CURRENT STUDY)
 - WATER WELL LOCATION

NOTE
THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

REFERENCE
LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES. © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT			
CAPITAL REGION RESOURCE RECOVERY CENTRE			
TITLE			
Comparison of Simulated and Measured Groundwater Elevations			
	PROJECT No. 12-1125-0045		SCALE AS SHOWN
	DESIGN	MIB Nov. 2013	REV.0
	GIS	---	---
	CHECK	PLE Aug. 2014	---
	REVIEW	PAS Aug. 2014	

FIGURE 12-5



CROSS-SECTION A-A'
Scale as Shown

LEGEND

WATERBODIES

ROADS

PROPERTY BOUNDARY

SURFICIAL SILTY SAND

SILTY CLAY

GLACIAL TILL

CARLSBAD BEDROCK FORMATION

WASTE

DRAINAGE LAYER

GCL

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING
GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES. © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT

CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

Simulated Post-Development Cross-Section

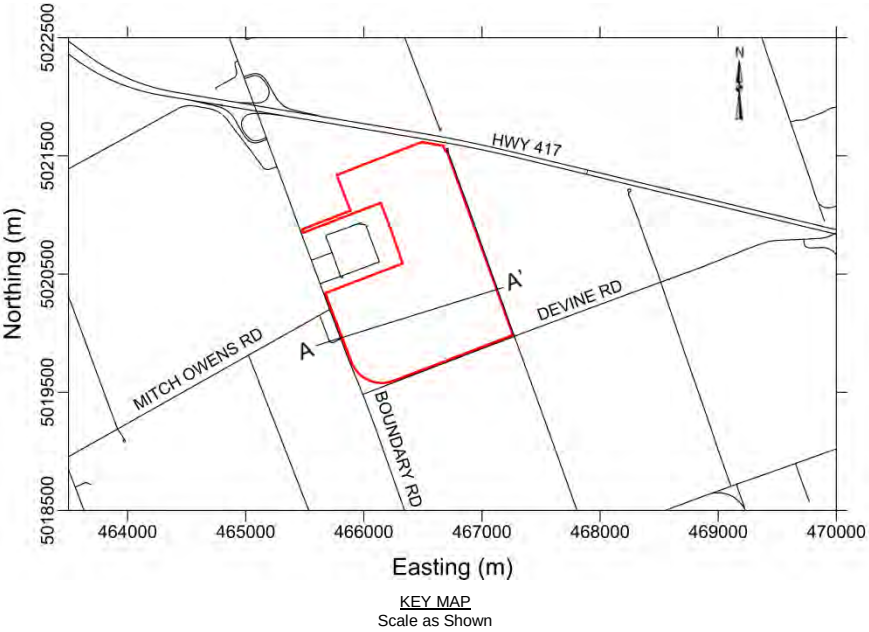
Golder Associates

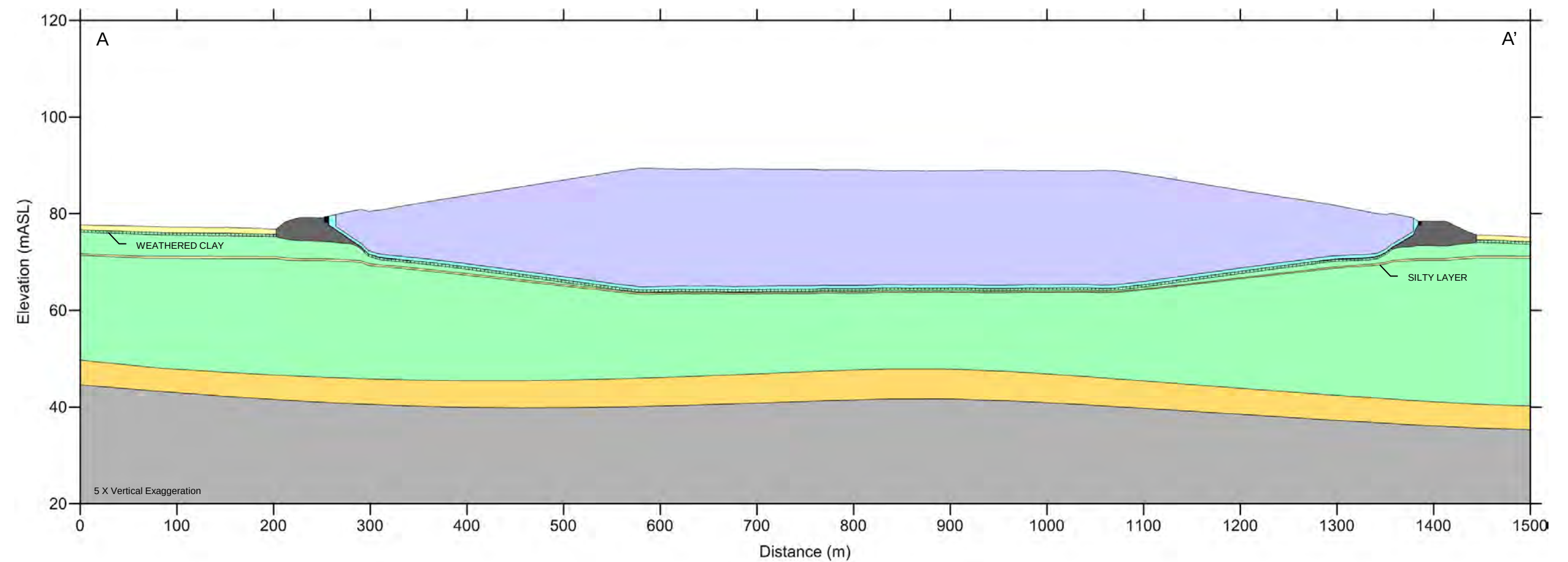
Ottawa, Ontario

PROJECT No.	12-1125-0045	SCALE AS SHOWN	REV.0
DESIGN	MIB	Nov. 2013	
GIS	---	---	
CHECK	PLE	Aug. 2014	
REVIEW	PAS	Aug. 2014	

FIGURE 12-6

SUMMARY OF HYDRAULIC PARAMETERS				
Unit	Horizontal Hydraulic Conductivity (m/sec)	Anisotropy (K _H :K _V)	Specific Storage (m ⁻¹)	Specific Yield (-)
Surficial Silty Sand	2.0 x 10 ⁻⁵	1:1	2.0 x 10 ⁻⁴	0.2
Weathered Clay	1.0 x 10 ⁻⁷	10:1	2.0 x 10 ⁻³	0.05
Unweathered Clay	1.0 x 10 ⁻⁸	10:1	2.0 x 10 ⁻³	0.05
Silty Layer	8.0 x 10 ⁻⁷	1:1	2.0 x 10 ⁻⁴	0.1
Glacial Till	1.5 x 10 ⁻⁶	1:1	2.0 x 10 ⁻⁴	0.1
Queenston Shale Bedrock Formation	5.5 x 10 ⁻⁷	1:1	3.0 x 10 ⁻⁶	0.01
Carlsbad Bedrock Formation	7.0 x 10 ⁻⁷	1:1	3.0 x 10 ⁻⁶	0.01
Waste (Operations)	1.0 x 10 ⁻⁵	1:1	2.0 x 10 ⁻³	0.1
Waste (Closure)	1.2 x 10 ⁻⁵	1:1	2.0 x 10 ⁻³	0.1
Drainage Layer	1.0 x 10 ⁻⁴	1:1	2.0 x 10 ⁻⁴	0.3
GCL	3.0 x 10 ⁻¹⁰	1:1	2.0 x 10 ⁻³	0.0001
Berm	1.0 x 10 ⁻⁷	1:1	2.0 x 10 ⁻³	0.05





CROSS-SECTION A-A'
Scale as Shown

LEGEND

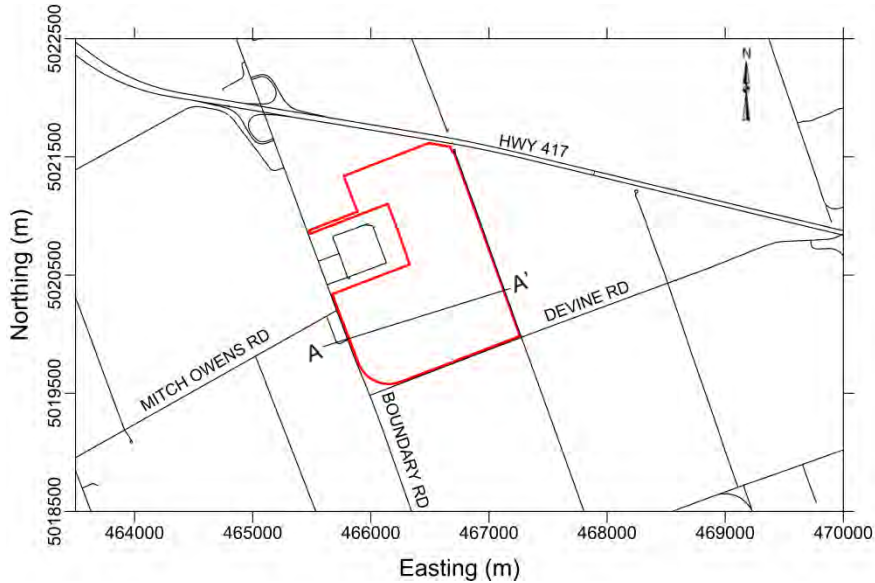
- WATERBODIES
- ROADS
- PROPERTY BOUNDARY
- SURFICIAL SILTY SAND
- SILTY CLAY
- GLACIAL TILL
- CARLSBAD BEDROCK FORMATION
- WASTE
- DRAINAGE LAYER
- GCL

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING
GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER
ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL
RESOURCES. © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE
MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18



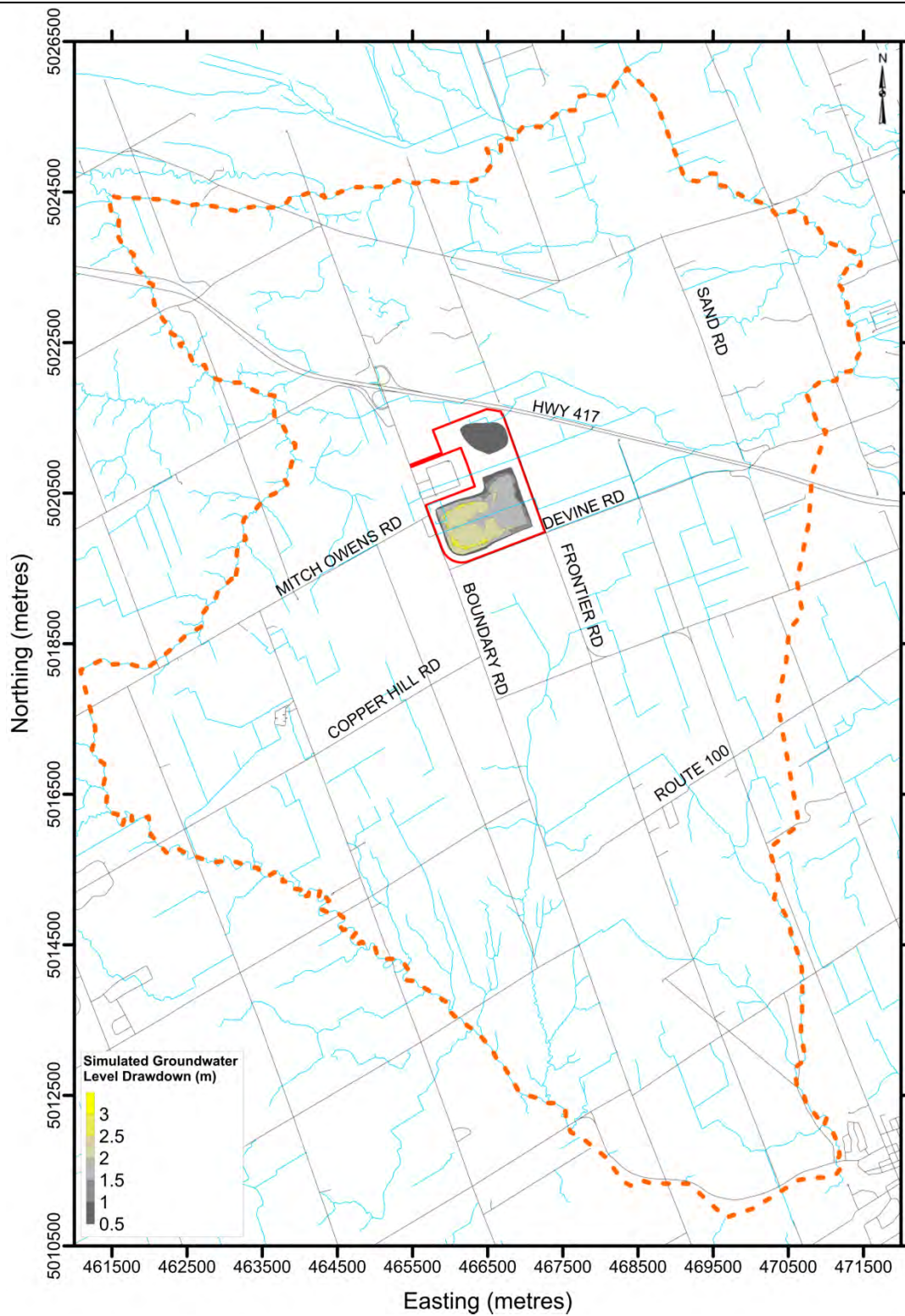
KEY MAP
Scale as Shown

SUMMARY OF HYDRAULIC PARAMETERS

Unit	Horizontal Hydraulic Conductivity (m/sec)	Anisotropy (K _H :K _V)	Specific Storage (m ⁻¹)	Specific Yield (-)
Surficial Silty Sand	2.0 x 10 ⁻⁵	1:1	2.0 x 10 ⁻⁴	0.2
Weathered Clay	1.0 x 10 ⁻⁷	100:1 ⁽¹⁾	2.0 x 10 ⁻³	0.05
Unweathered Clay	1.0 x 10 ⁻⁸	100:1 ⁽¹⁾	2.0 x 10 ⁻³	0.05
Silty Layer	8.0 x 10 ⁻⁷	1:1	2.0 x 10 ⁻⁴	0.1
Glacial Till	1.5 x 10 ⁻⁶	1:1	2.0 x 10 ⁻⁴	0.1
Queenston Shale Bedrock Formation	5.5 x 10 ⁻⁷	1:1	3.0 x 10 ⁻⁶	0.01
Carlsbad Bedrock Formation	7.0 x 10 ⁻⁷	1:1	3.0 x 10 ⁻⁶	0.01
Waste (Operations)	1.0 x 10 ⁻⁵	1:1	2.0 x 10 ⁻³	0.1
Waste (Closure)	1.2 x 10 ⁻⁵	1:1	2.0 x 10 ⁻³	0.1
Drainage Layer	1.0 x 10 ⁻⁴	1:1	2.0 x 10 ⁻⁴	0.3
GCL	3.0 x 10 ⁻¹⁰	1:1	2.0 x 10 ⁻³	0.0001
Berm	1.0 x 10 ⁻⁷	1:1	2.0 x 10 ⁻³	0.05

1: 100:1 Anisotropy applied to consolidated clay, 10:1 Anisotropy applied to unconsolidated clay

PROJECT				
CAPITAL REGION RESOURCE RECOVERY CENTRE				
TITLE				
Simulated Post-Development Post-Settlement Cross-Section				
	PROJECT No. 12-1125-0045		SCALE AS SHOWN	REV.0
	DESIGN	MIB	Nov. 2013	
	GIS	---	---	
	CHECK	PLE	Aug. 2014	
	REVIEW	PAS	Aug. 2014	
FIGURE 12-7				



LEGEND

- WATERBODIES
- ROADS
- PROPERTY BOUNDARY
- - - MODEL DOMAIN

NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT

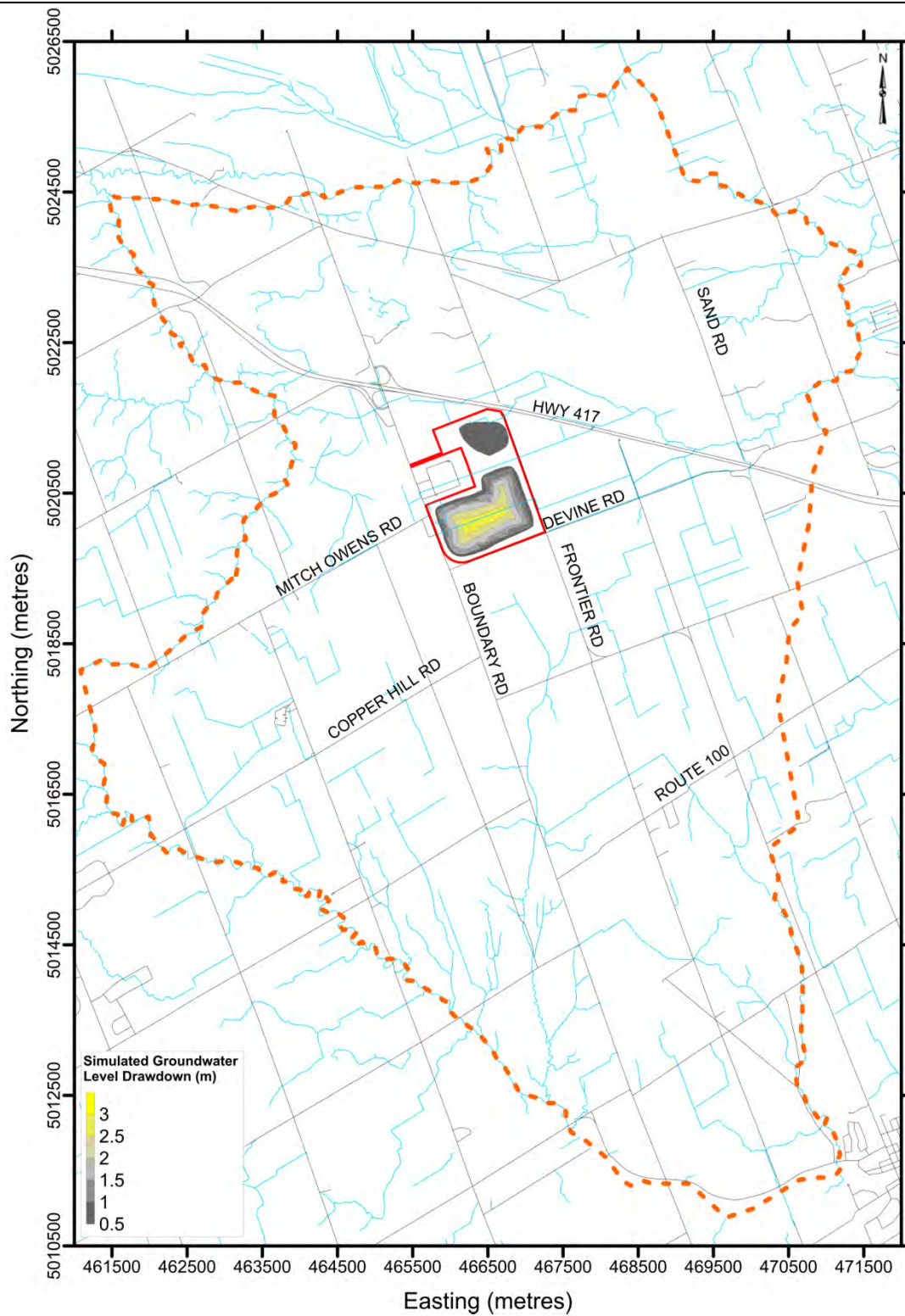
CAPITAL REGION RESOURCE RECOVERY CENTRE

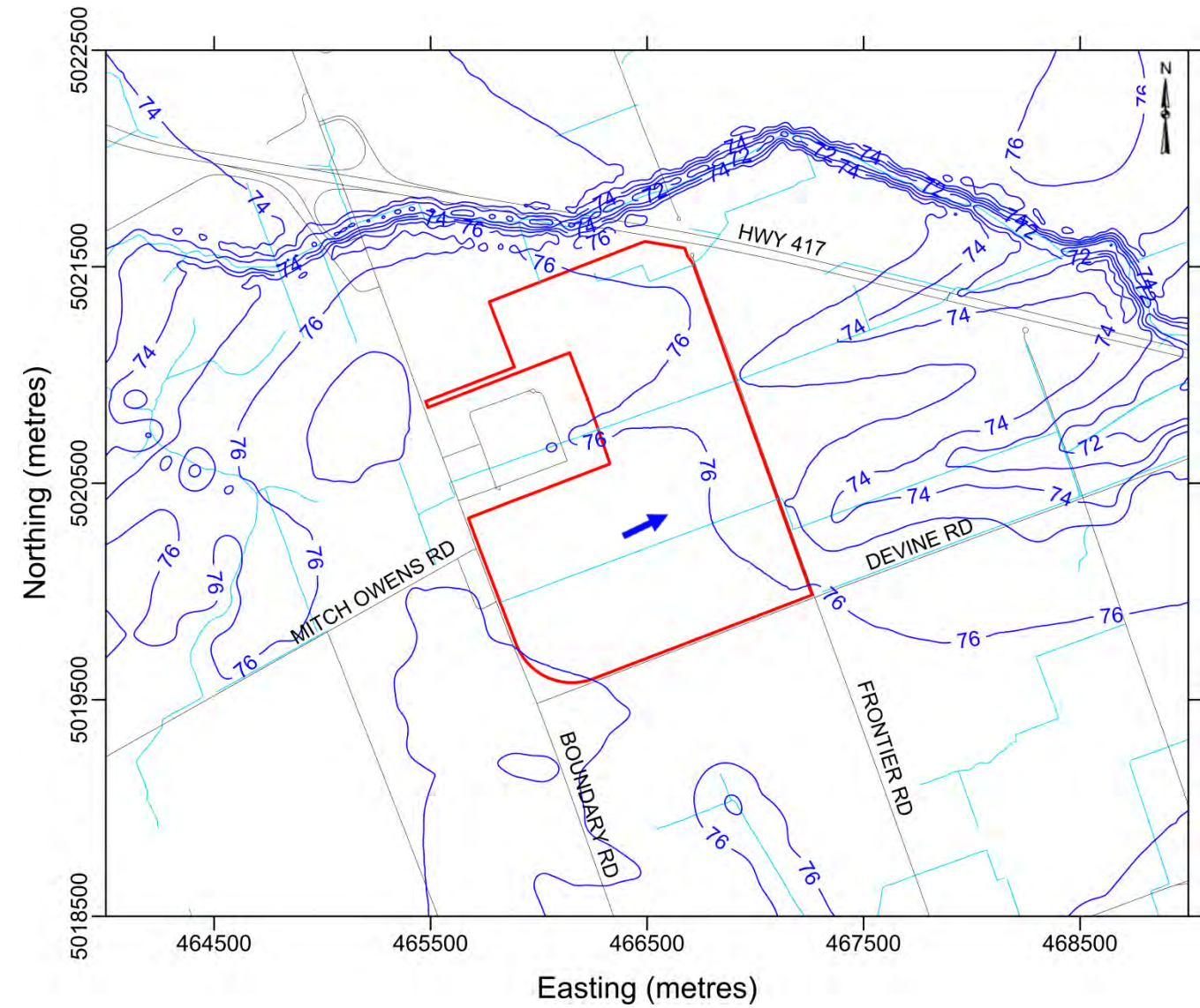
TITLE

Simulated Pre-Failure Groundwater Drawdown (PS1: pre-settlement)

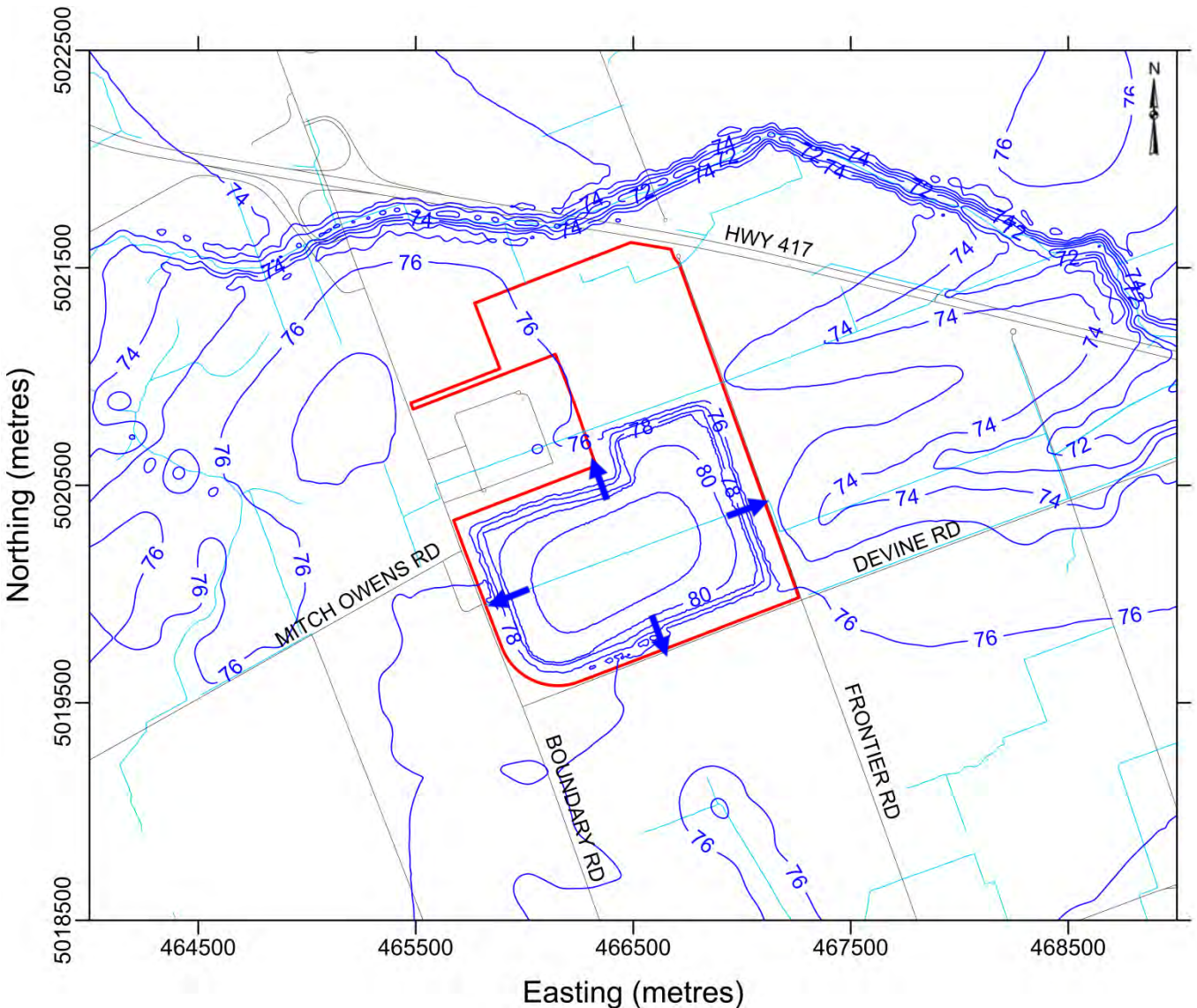


PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	MIB	Nov. 2013	SCALE AS SHOWN	REV.0
GIS	--	--	FIGURE 12-8	
CHECK	PLE	Aug. 2014		
REVIEW	PAS	Aug. 2014		





CALIBRATED PRE-DEVELOPMENT CONDITIONS
SLICE 3: SURFICIAL SILTY SAND AND CLAY



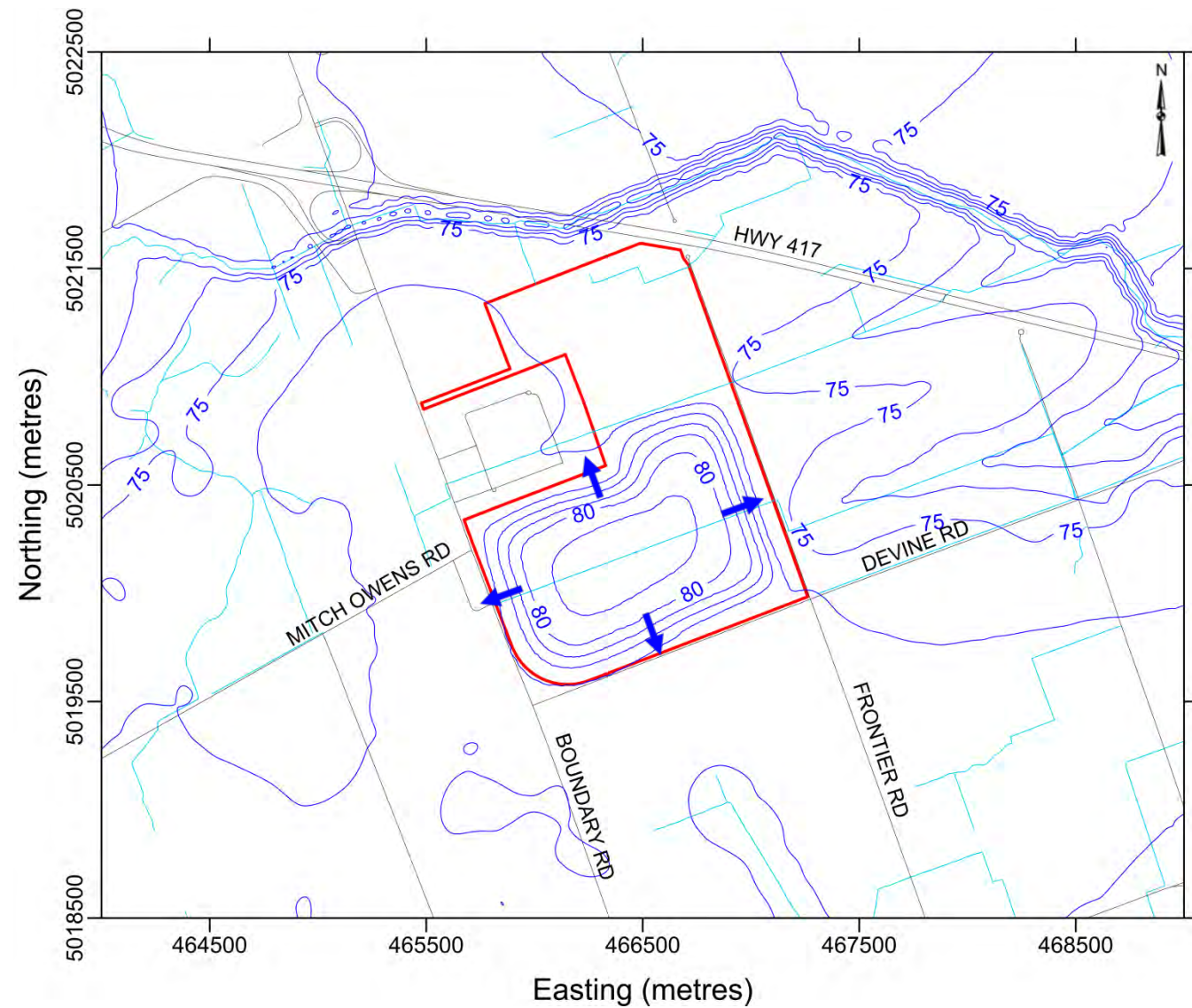
STEADY-STATE POST-FAILURE CONDITIONS
SLICE 3: SURFICIAL SILTY SAND AND CLAY

- LEGEND**
- WATERBODIES
 - ROADS
 - PROPERTY BOUNDARY
 - GROUNDWATER ELEVATION (metres ABOVE SEA LEVEL)
(1 metre contour interval)
 - INTERPRETED GROUNDWATER FLOW DIRECTION

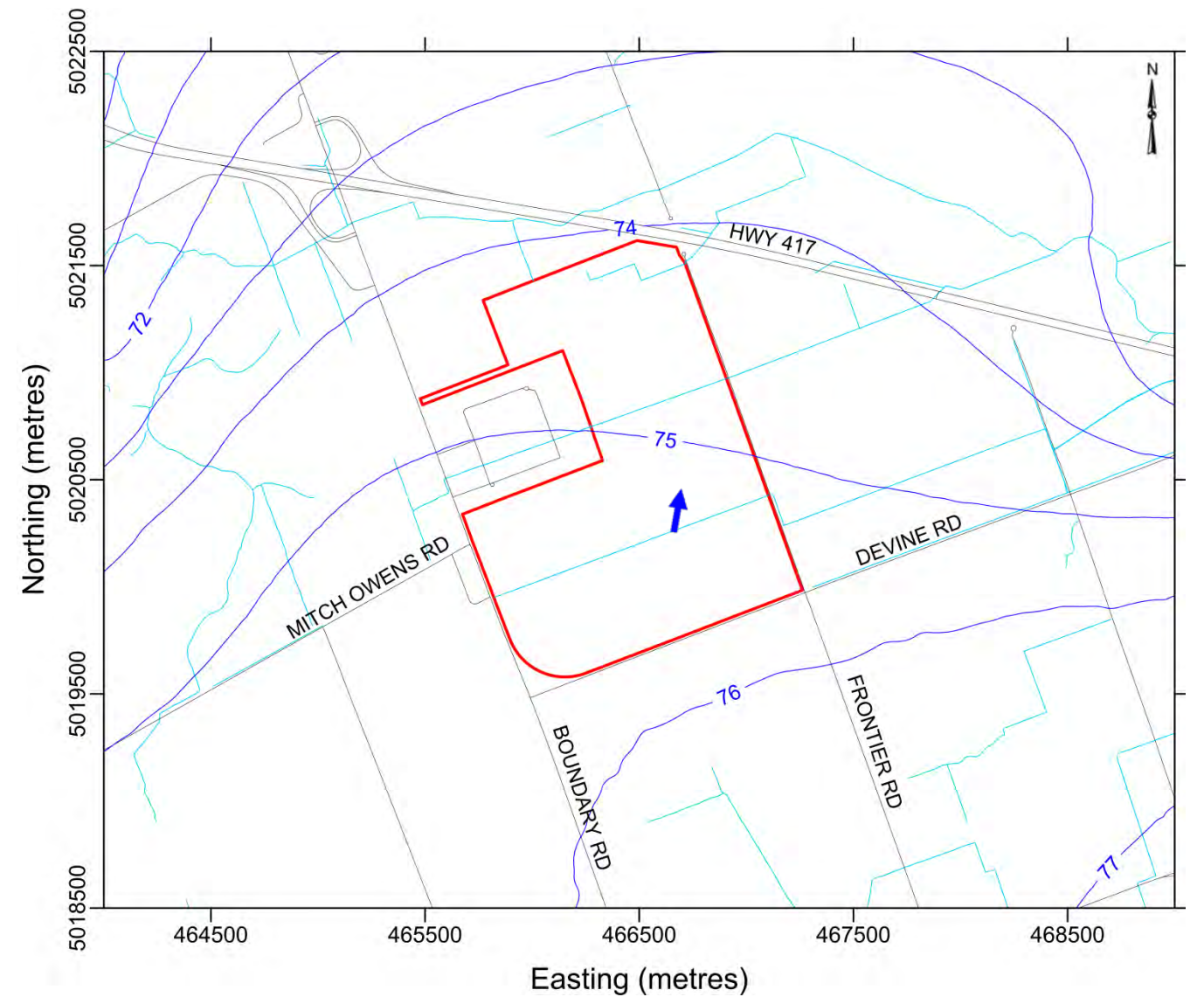
NOTE
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REFERENCE
LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER
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RESOURCES. © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE
MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT		CAPITAL REGION RESOURCE RECOVERY CENTRE	
TITLE		Simulated Post-Failure Groundwater Elevation (PS3: post-settlement)	
	PROJECT No.	12-1125-0045	SCALE AS SHOWN
	DESIGN	MIB Nov. 2013	REV.0
	GIS	Aug. 2014	FIGURE 12-10
	CHECK	PLE Aug. 2014	
		REVIEW	PAS Aug. 2014



SLICE 11: SILTY LAYER



SLICE 16: GLACIAL TILL / BEDROCK CONTACT

LEGEND

- WATERBODIES
- ROADS
- PROPERTY BOUNDARY
- 75— SIMULATED HYDRAULIC HEAD (metres) (one metre contour interval)
- ➔ INTERPRETED GROUNDWATER FLOW DIRECTION

NOTE

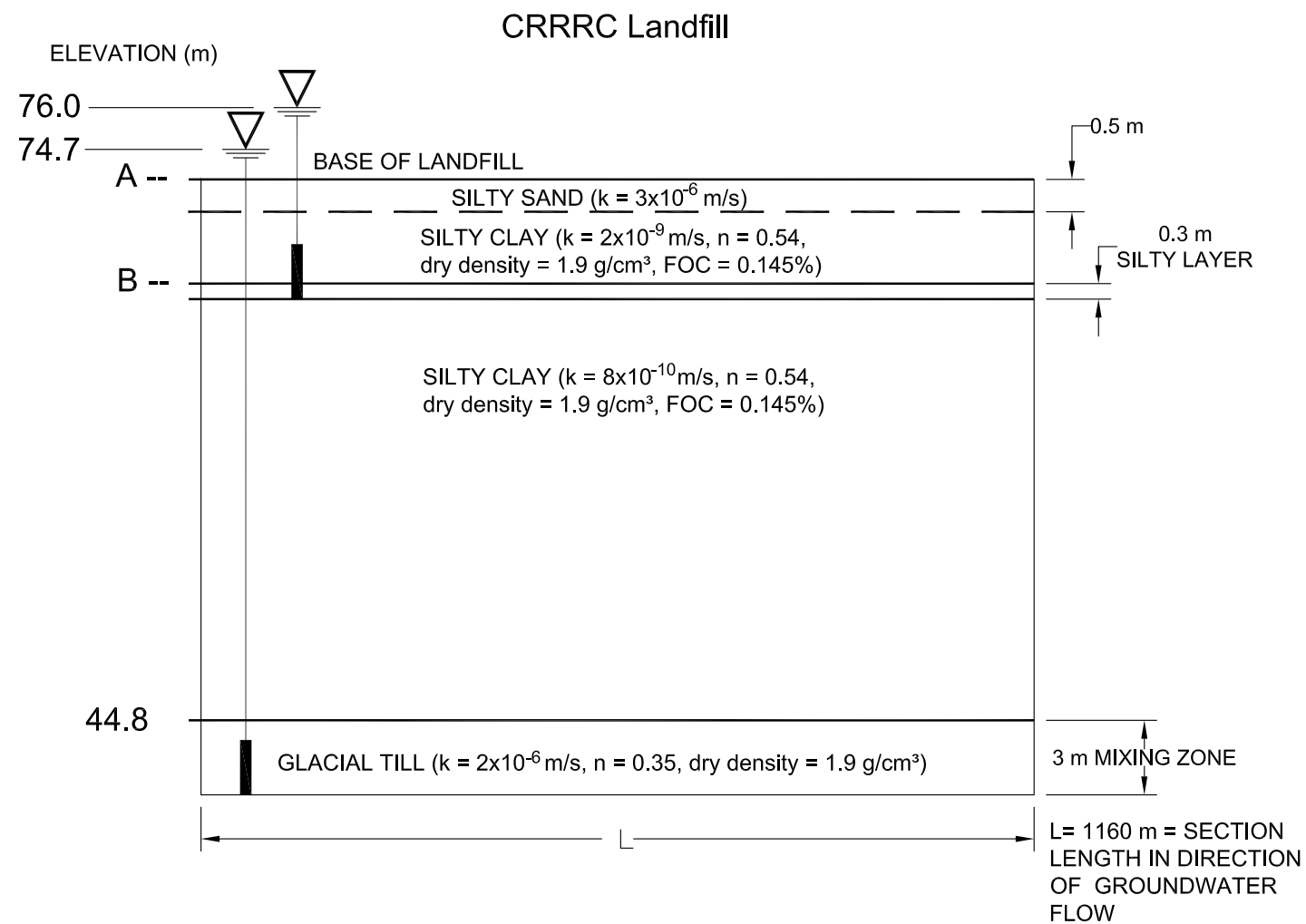
THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT

REFERENCE

LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENSE FROM ONTARIO MINISTRY OF NATURAL RESOURCES. © QUEENS PRINTER 2011. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT				
CAPITAL REGION RESOURCE RECOVERY CENTRE				
TITLE				
Simulated Post-Failure Hydraulic Head (PS3: post-settlement)				
	PROJECT No. 12-1125-0045			SCALE AS SHOWN
	DESIGN	MIB	Nov. 2013	REV.0
	GIS	---	---	
	CHECK	PLE	Aug. 2014	
	REVIEW	PAS	Aug. 2014	
FIGURE 12-11				

PLOT DATE: June 26, 2014
FILENAME: N:\Active\Spatial_IM\Miller_Paving_Ltd\CRRRC\ACAD\Vol 3 (Report Figures)\1211250045-V3-12-12.DWG



Years Past Closure	A (m ASL)	B (m ASL)
0 YEARS (CLOSURE)	74.4	71.1
10 YEARS	71.5	69.4
50 YEARS	70.4	68.3
80 YEARS * (FAILURE OF LEACHATE COLLECTION SYSTEM)	70.2	68.1

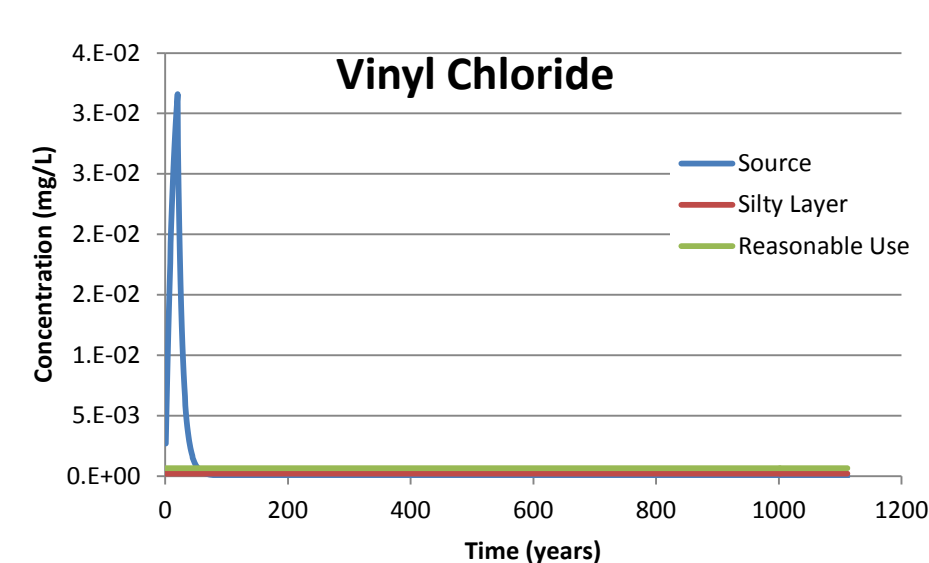
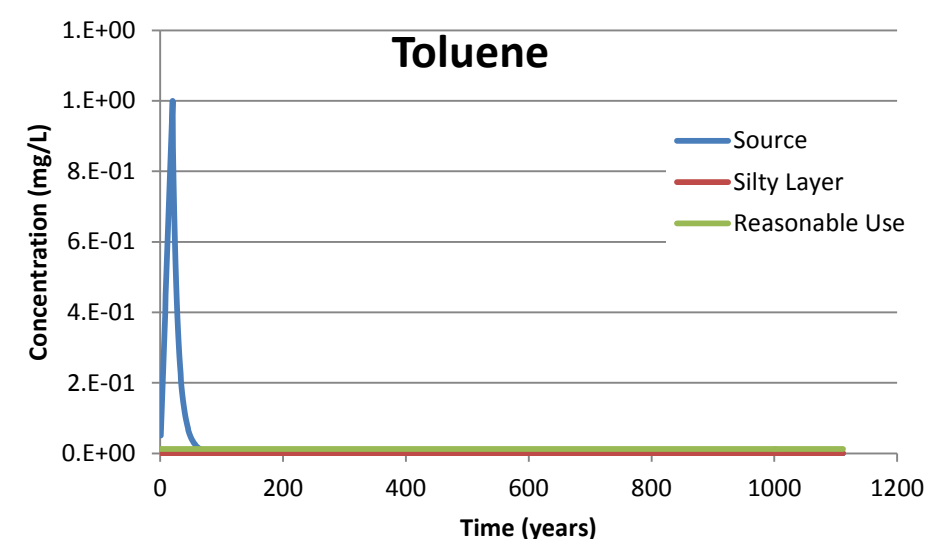
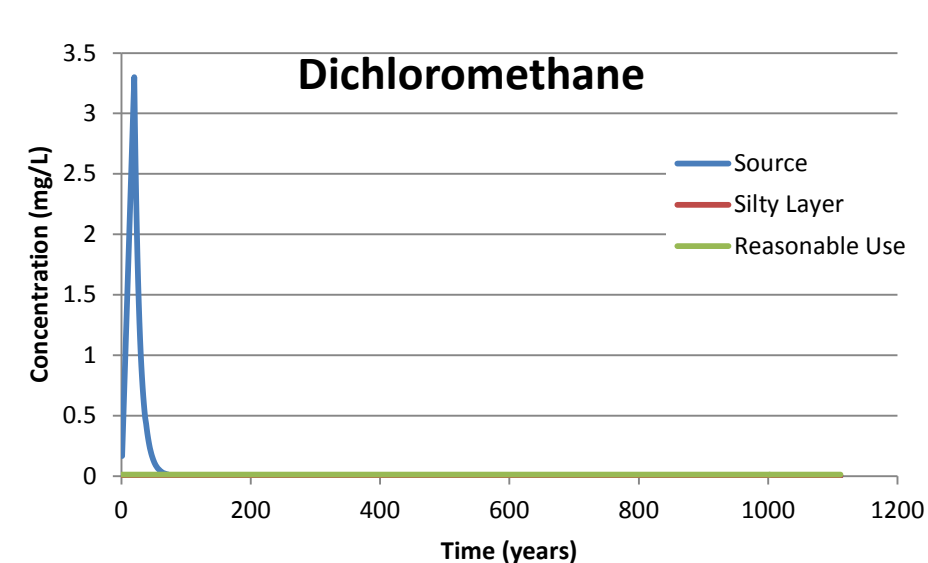
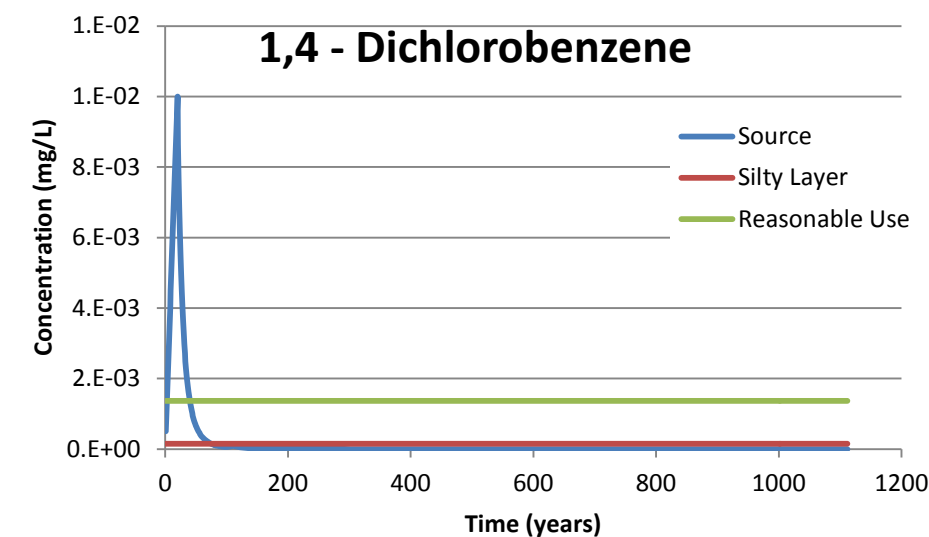
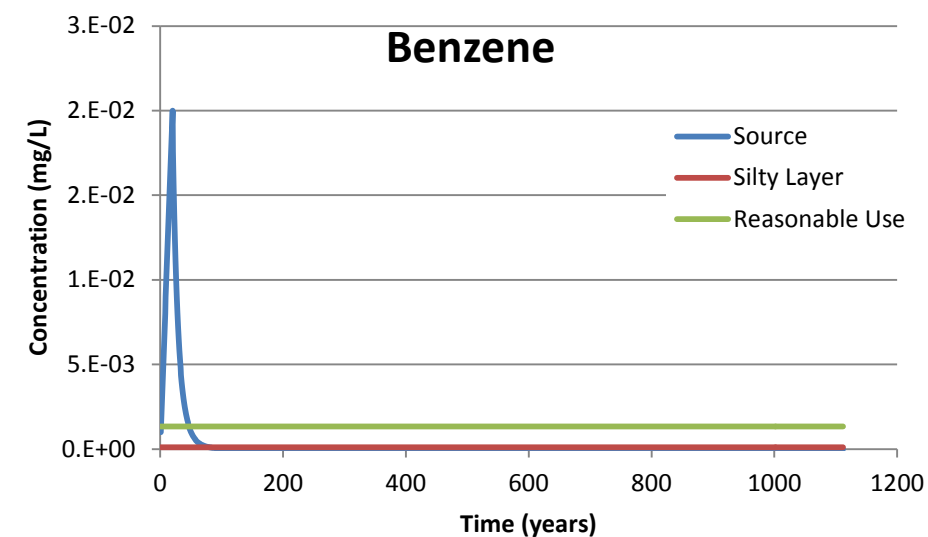
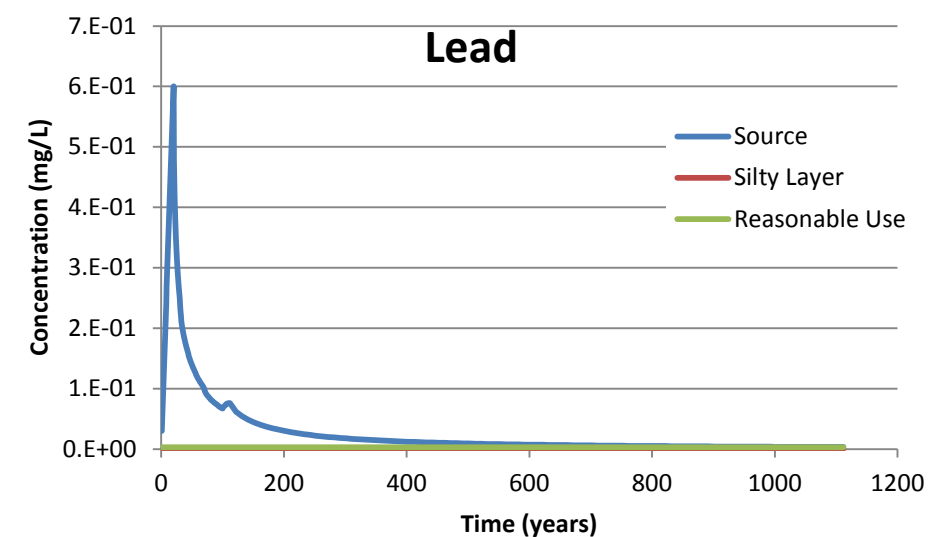
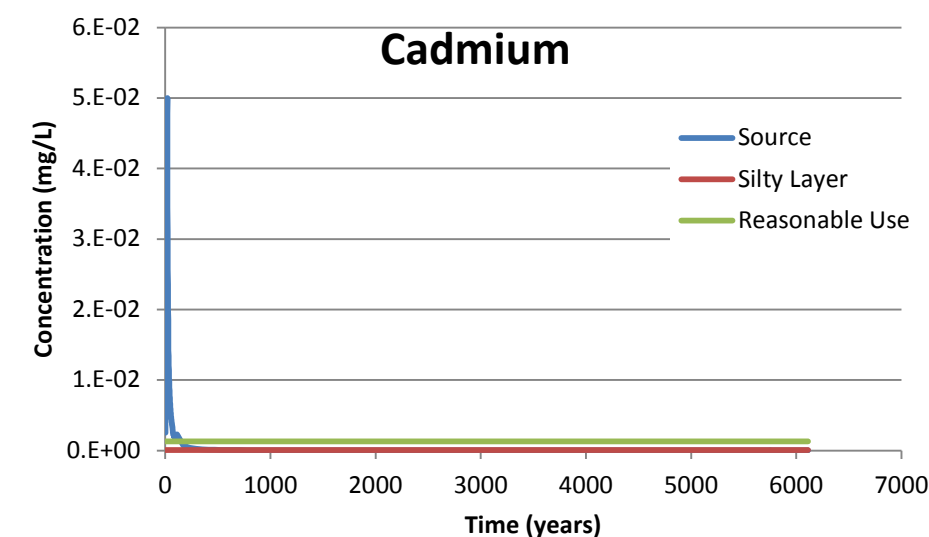
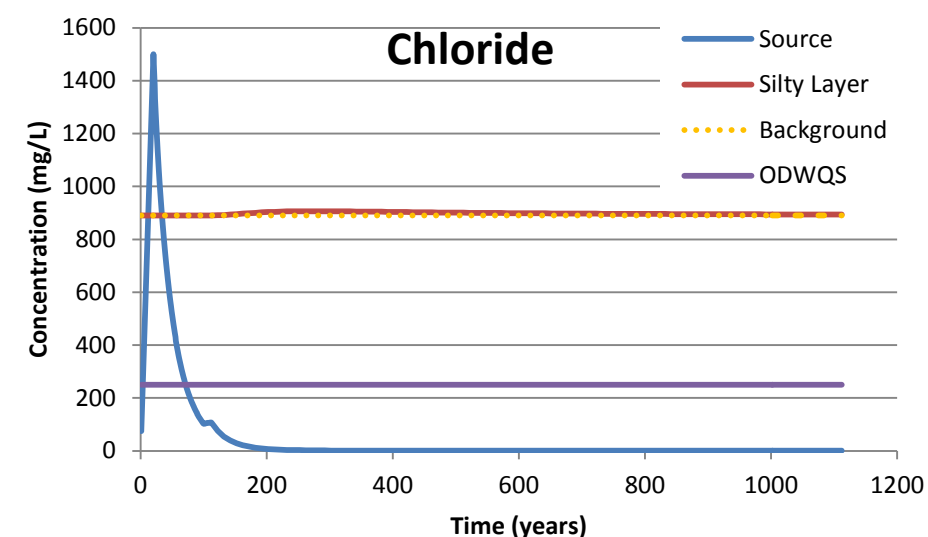
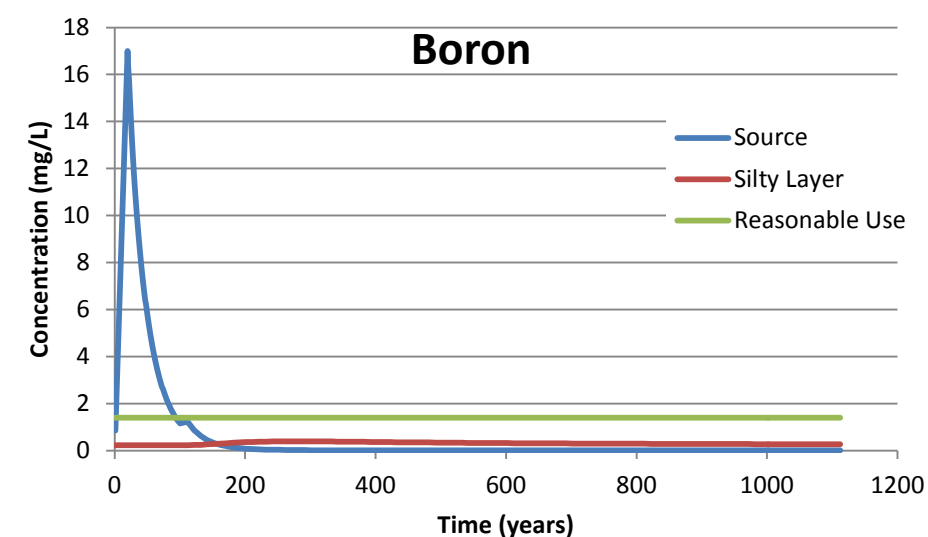
* Used 100 year settlement numbers at this time to be conservative

NOTES:

- THIS DRAWING / FIGURE IS TO BE READ IN CONJUNCTION WITH GOLDER ASSOCIATES LTD. REPORT.

									
REV	DATE	DES	REVISION DESCRIPTION	CAD	CHK	RVW			
PROJECT									
CAPITAL REGION RESOURCE RECOVERY CENTRE									
TITLE									
SIMPLIFIED CROSS-SECTIONS FOR CONTAMINANT TRANSPORT MODEL									
 Golder Associates Ottawa, Ontario, Canada			PROJECT No.	12-1125-0045	FILE No.	1211250045-V3-12-12.DWG			
			DESIGN	M.K.F.	27 Nov. 2013	SCALE	N.T.S.	REV.	0
			CAD	M.L.F.	27 Nov. 2013	DRAWING No.			
			CHECK	P.L.E.	Aug. 2014	Figure 12-12			
			REVIEW	P.A.S.	Aug. 2014				





NOTE
THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING
GOLDER ASSOCIATES LTD. REPORT

PROJECT			
CAPITAL REGION RESOURCE RECOVERY CENTRE			
TITLE			
Results of Contaminant Transport Model			
	PROJECT No. 12-1125-0045		SCALE AS SHOWN
	DESIGN	MKF	Nov. 23/2013
	GIS	MKF	Nov. 23/2013
	CHECK	PLE	Aug. 2014
		REVIEW	MKF
			Aug. 2014
FIGURE 12-13			

